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IS 4152 (2011): Seamless Carbon Dioxide Cylinders for Fire-fighting Purposes on Boardship [MED 16: Gas Cylinders]

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कार्बन डाइऑक्साइड सिलिंडर — विशिष्टि
(तीसरा पुनरीक्षण)

Indian Standard
SEAMLESS CARBON DIOXIDE CYLINDERS
FOR FIRE FIGHTING PURPOSES ON
BOARDSHIP—SPECIFICATION
(*Third Revision*)

ICS 13.220.10; 23.020.30

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Gas Cylinders Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was first published in 1967 and subsequently revised in 1978 and 1989. This standard is in line with the latest ISO 3500 : 2005 ‘Gas cylinders – Seamless steel CO₂ cylinder for fixed fire-fighting installations on ships’. Following major changes have been incorporated in this revision:

- a) Cylinders of water capacity from 80 to 87 litres have been included.
- b) Use of aluminium alloy is permitted according to IS 15660 : 2006 ‘Refillable transportable seamless aluminium alloy gas cylinders — Specification’ for manufacturing cylinders.

Periodical testing of carbon dioxide cylinders for fire-fighting purposes on boardships is obligatory under the statutory provisions and is also covered under the International Conference of Safety of Life at Sea, 1960. Often these cylinders are required to be changed at any port in the world. This necessitates that the size of the cylinder used for this purpose should be dimensionally standardized to ensure interchangeability.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SEAMLESS CARBON DIOXIDE CYLINDERS FOR FIRE FIGHTING PURPOSES ON BOARDSHIP—SPECIFICATION

(Third Revision)

1 SCOPE

This standard deals with light-weight seamless carbon dioxide cylinders of water capacity 45 litres, 67.5 litres and 80 to 87 litres used in fire-fighting installations on boardships. It lays down the requirements for the material to be used in the manufacture of these cylinders, their construction, marking and testing. It also specifies the principal external dimensions of the cylinders.

2 REFERENCES

The standards listed below contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
3224 : 2002	Valve fittings for compressed gas cylinders excluding liquefied petroleum gas (LPG) cylinders — Specification (second revision)
4379 : 1981	Identification of contents of industrial gas cylinders (first revision)

IS No.	Title
7241 : 1981	Glossary of terms used in gas cylinder technology (first revision)
7285 (Part 2) : 2004	Refillable seamless steel gas cylinder — Specification: Part 2 Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa (112 kgf/mm ²) (third revision)
15660 : 2006	Refillable transportable seamless aluminium alloy gas cylinders — Specification

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 7241 and the following shall apply.

3.1 Tare — The combined mass of empty cylinder, neck collar, valve and siphon tube expressed in kg.

3.2 Permissible Filling Ratio — Maximum permissible mass of carbon dioxide, in kilogram per litre, of cylinder water capacity.

4 GENERAL CHARACTERISTICS

4.1 Cylinder

4.1.1 The cylinder shall be designed for a minimum, test pressure of 250 kgf/cm². Steel cylinders shall

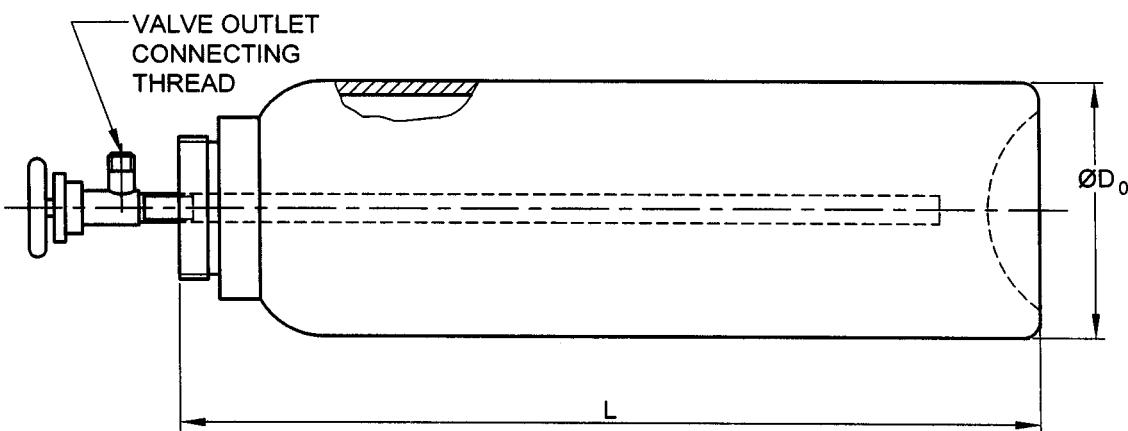


FIG. 1 EXTERNAL DIMENSIONS OF STEEL CYLINDER

conform to the requirement of IS 7285 (Part 2) and aluminium cylinders shall conform to the requirements of IS 15660.

4.1.2 The external dimensions of steel cylinder, illustrated in Fig. 1, shall be in accordance with the values given in Table 1.

4.1.3 Cylinders in this service are subject to severe environmental conditions due to saline exposure. It is common practice to have an additional thickness allowance of 10 percent for such cylinders.

4.2 Valve

4.2.1 The valve inlet connection shall be in accordance with IS 3224. The valve outlet connection shall be W 21.8 × 1.814 mm external right hand according to outlet No. 7 of IS 3224.

4.2.2 The internal diameter of the valve inlet and outlet opening shall be such that 85 percent of the CO₂ contents can be discharged into the fire location within 2 min. Siphon tubes shall be durably fitted to the valve stem's internal threading.

4.3 Pressure-Relief Devices

A pressure-relief device shall be fitted to prevent the cylinder gas pressure rising above 225 kgf/cm². The relief pressure shall be indicated on the valve.

5 CYLINDER MARKING

5.1 The cylinder shall be marked in accordance with IS 7285 (Part 2) or IS 15660, as appropriate. The cylinder shall be permanently stamp marked on the shoulder with the chemical symbol 'CO₂' or the name 'Carbon dioxide'.

The presence of the siphon tube, as fitted to the valve shall be indicated by means of a corrosion resistant ring between the valve and the cylinder.

5.2 BIS Certification Marking

The cylinder may also be marked with the Standard Mark.

5.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 COLOUR IDENTIFICATION

6.1 The cylinder shall be painted externally in accordance with the colour scheme specified in IS 4379 or as specified by statutory authority.

6.2 Export Market

Cylinder manufactured for export shall be painted externally as agreed to between the purchaser and the manufacturer.

7 RECORDS

Records shall be kept of all the tests made at the cylinder manufacturer's works and copies shall be forwarded to the purchaser of the cylinder and the inspecting authority.

8 PREPARATION FOR DISPATCH

Before being dispatched from the manufacturer's works, all cylinders shall be thoroughly cleaned and all particles of grit, filling or other matter which may have collected inside the cylinder in the course of manufacture, heat treatment and testing shall be removed completely and the cylinders dried internally by heating uniformly to a temperature not exceeding 300°C. The outside surface of the cylinder shall be given a suitable protective coating before dispatch.

Table 1 General Characteristics for Steel Cylinders

(Clause 4.1.2)

SI No.	Size	Water Capacity	Maximum Permissible Mass of CO ₂	Maximum Tare Mass	Outside Dia, D _o ¹⁾	Length L ¹⁾	Filling Ratio	Minimum Test Pressure, P _h kgf/cm ²
			l	kg				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	A	45	30	55	227-235	1 263-1 420	0.667	250
ii)	B	67.5	45	80	265-273	1 395-1 562	0.667	250
iii)	C	80-87	53-58	96-104	260-290	1 680-1 800	0.667	250

NOTE — The dimensions and general characteristics for steel cylinders as given in Fig. 1 and above. Comments on dimensions and general characteristics for aluminium cylinders are also invited.

¹⁾ In order to obtain the minimum specified volume, it is necessary to provide ranges for both outside diameter and length having regard to the possible variations in manufacturing process involved.

ANNEXA
(Foreword)

COMMITTEE COMPOSITION

Gas Cylinders Sectional Committee, MED 16

<i>Organization</i>	<i>Representative(s)</i>
Petroleum and Explosive Safety Organization, Nagpur	SHRI AJAI NIGAM (Chairman) SHRI D. K. GUPTA (<i>Alternate</i>)
All India Industrial Gases Manufacturers Association, New Delhi	SHRI KARAN BHATIA SHRIMATI VEENA PETER (<i>Alternate</i>)
Bharat Petroleum Corporation Ltd, Mumbai	SHRI THARIYAN GEORGE SHRI SANJAY PHULLI (<i>Alternate</i>)
Bharat Pumps and Compressors Ltd, Allahabad	SHRI J. P. SINHA SHRI P. G. CHOUDHURY (<i>Alternate</i>)
BOC India Ltd, Kolkata	SHRI K. MANOHARAN SHRI RAMANA VUTUKURU (<i>Alternate</i>)
Everest Kanto Cylinder Ltd, Mumbai	SHRI P. M. SAMVATSAR SHRI A. K. KHAMKAR (<i>Alternate</i>)
Hindustan Petroleum Corporation Ltd, Mumbai	SHRI P. P. NADKARNI SHRI ALOK KUMAR GUPTA (<i>Alternate</i>)
Indian Oil Corporation Ltd, Mumbai	SHRI S. S. SAMANT SHRI RAJESH HAZARNIS (<i>Alternate</i>)
International Industrial Gases Ltd, Kolkata	SHRI DEVENDRA K. GARG SHRI NIKHILESH K. GARG (<i>Alternate</i>)
Kabsons Gas Equipments Ltd, Hyderabad	SHRI SATISH KABRA SHRI S. GOPALAIAH (<i>Alternate</i>)
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LPG Equipment Research Centre, Bangalore	SHRI G. P. GUPTA SHRIMATI KAROBI MUKHERJEE (<i>Alternate</i>)
Mahanagar Gas Limited, Mumbai	SHRI RAGHUNATH KULAI SHRI ARUN NAYAK (<i>Alternate</i>)
Maruti Koatsu Cylinders Ltd, Mumbai	SHRI NITIN J. THAKKAR SHRI A. S. SARAN (<i>Alternate</i>)
Ministry of Defence (DGQA), Pune	SHRI J. P. TIWARI LT COL B. V. RAVI KUMAR (<i>Alternate</i>)
Praxair India Ltd, Bangalore	SHRI MILAN SARKAR SHRI ARINDAM DAS (<i>Alternate</i>)
Research & Development Estt (Engineers), Pune	SHRI P. K. CHATTOPADHYAY SHRI A. BASU (<i>Alternate</i>)
Sakha Engineers Pvt Ltd, New Delhi	SHRI AMARJIT S. KOHLI
SICGIL India Ltd, Chennai	SHRI FAROOQUE DADABHOY SHRI R. PADMANABAN (<i>Alternate</i>)
Steel Authority of India Ltd, Ranchi	SHRI DEBASHIS KARMAKAR DR B. K. JHA (<i>Alternate</i>)
Steel Authority of India Ltd, Salem	SHRI T. KALYANASUNDARAM SHRI N. K. VIJAYAVARGIA (<i>Alternate</i>)
Supreme Cylinders Ltd, Delhi	SHRI M. L. FATEHPURIA

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Vanaz Engineers Ltd, Pune	SHRI S. K. KHANDEKAR SHRI S.R. SARVATE (<i>Alternate</i>)
In personal capacity (<i>Menon & Patel, 14/1, Mile, Mathura Road, Faridabad</i>)	SHRI EBRAHIM M. PATEL
In personal capacity (<i>303, Shantikunj, Pandav Bunglows Lane Athwalines, Surat</i>)	SHRI L. D. THAKKAR
BIS Directorate General	SHRI C. K. VEDA, Scientist 'F' and Head (MED) [Representing Director General (<i>Ex-officio</i>)]
<i>Member Secretary</i>	
	SHRI VISHAL TOMER Scientist 'C' (MED), BIS

Dissolved Acetylene Cylinders, Generators, Acetylene Pipe Lines and High Pressure Gas Cylinders Subcommittee, MED 16 : 3

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Bharat Pumps and Compressors Ltd, Allahabad	SHRI J. P. SINHA SHRI P. G. CHOUDHURY (<i>Alternate</i>)
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Ministry of Defence (DGQA), Pune	SHRI J. P. TIWARI LT COL B. V. RAVI KUMAR (<i>Alternate</i>)

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Praxair India Ltd, Bangalore	SHRI MILAN SARKAR SHRI ARINDAM DAS (<i>Alternate</i>)
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Strategic Engineering (P) Ltd, Chennai	DR M. RAMAKRISHNA SHRI G. S. VISWANATH (<i>Alternate</i>)
Techno Valves, Kolkata	SHRI Y. K. BEHANI SHRI R. BEHANI (<i>Alternate</i>)

Bureau of Indian Standards

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Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 Website: www.bis.org.in

Regional Offices:

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14, C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
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Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
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